Naval Education and Training Command

NAVEDTRA 82001
February 1992
0503-LP-213-7800

Nonresident Training Course (NRTC)

Fireman

Only one answer sheet is included in the NRTC. Reproduce the required number of sheets you need or get answer sheets from your ESO or designated officer.

0503LP2137800

COMMANDING OFFICER
NETPDTC
6490 SAUFLEY FIELD RD
PENSACOLA, FL 32509-5237

ERRATA #1 13 May 2000

Specific Instructions and Errata for the
Nonresident Training Course

FIREMAN, NAVEDTRA 82001

1. No attempt has been made to issue corrections for errors in typing, punctuation, etc., that do not affect your ability to answer the question or questions.

2. To receive credit for deleted questions, show this errata to your local course administrator (ESO/scorer). The local course administrator is directed to correct the course and the answer key by indicating the questions deleted.

3. Assignment Booklet, NAVEDTRA 82001.

Delete the following question, and leave the corresponding spaces blank on the answer sheets:

Question

2-15

FIREMAN

NAVEDTRA 82001

Prepared by the Naval Education and Training Program Management
Support Activity, Pensacola, Florida

Congratulations! By enrolling in this course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program. You have taken an important step in self-improvement. Keep up the good work.

HOW TO COMPLETE THIS COURSE SUCCESSFULLY

ERRATA: If an errata comes with this course, make all indicated changes or corrections before you start any assignment. Do not change or correct the Training Manual (TRAMAN) or assignments in any other way.

TEXTBOOK ASSIGNMENTS: The TRAMAN for this course is Fireman. NAVEDTRA 12001. The TRAMAN pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions in the course. Pay close attention to tables and illustrations because they contain information that will help you understand the text. Read the learning objectives provided at the beginning of each chapter or topic in the text and/or preceding each set of questions in the course. Learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

BLACK DOT INFORMATION: Black dots (●) may be used in the text and correspondence course to emphasize important or supplemental information and to highlight instructions for answering certain questions. Read these black dot entries carefully; they will help you answer the questions and understand the material.

SELECTING YOUR ANSWERS: After studying the TRAMAN, you should be ready to answer the questions in the assignment. Read each question carefully, then select the BEST answer. Be sure to select your answer from the subject matter in the TRAMAN. You may refer freely to the TRAMAN and seek advice and information from others on problems that may arise in the course. However, the answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the same course. Failure to follow these rules can result in suspension from the course and disciplinary action.

SUBMITTING COMPLETED ANSWER SHEETS: Complete all assignments as quickly as possible to derive maximum benefit from the course. As a minimum, you must submit at least one assignment per month. This is a requirement established by the Chief of Naval Education and Training. Failure to meet this requirement could result in disenrollment from the course.

TYPES OF ANSWER SHEETS: If you are a U.S. Navy enlisted member on active duty or a drilling U.S. Naval Reserve enlisted member, you should use the answer sheet attached at the end of this course and follow the instructions in section A below. If you are an enlisted U.S. Naval Reserve member who is not attached to a drilling unit or if you are an officer, a civilian, or a member of the U.S. Army, Air Force, Marine Corps, or Coast Guard, you should use the Automatic Data Processing (ADP) answer sheets included in the course package and follow the instructions in section B.

A. Manually Scored Answer Sheets

If you are a U.S. Navy enlisted member on active duty or attached to a U.S. Naval Reserve drilling unit, your course will be administered by your local command. You must use the answer sheet designed for manual scoring, NETPMSA form 1430/5, Stock

Ordering Number 0502-LP–216-0100. You may get a supply of the forms from your ESO or you may reproduce the one in the back of this course booklet. DO NOT USE THIS FORM FOR COURSES ADMINISTERED BY NETPMSA.

Recording Information on the Manually Scored Answer Sheets: As you complete each assignment, submit the completed answer sheet to your local educational services officer (ESO) for grading. You may submit more than one answer sheet at a time. Remember, you must submit at least one assignment each month.

Grading: Your ESO will grade each answer sheet and notify you of any incorrect answers. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, the ESO will list the questions you answered incorrectly and give you a pink answer sheet marked RESUBMIT. You must redo the assignment and complete the RESUBMIT answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

Course Completion: After you have submitted all the answer sheets and have earned at least 3.2 on each assignment, your command should give you credit for this course by making the appropriate entry on Page 4 of your service record.

Student Questions: If you have questions concerning the administration of this course, consult your local ESO.

B. ADP Answer Sheets

If you are an enlisted U.S. Naval Reserve member who is not attached to a drilling reserve unit or if you are an officer, a civilian, or a member of the U.S. Army, Air Force, Marine Corps, or Coast Guard, you should use the ADP answer sheets provided in your course package. You should use one blank original ADP answer sheet for each assignment. Use only the original ADP answer sheet provided in your course package, NETPMSA will not accept reproductions.

Recording Information on the ADP Answer Sheets: Carefully follow the MARKING INSTRUCTIONS on each answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This information identifies you (the student), the course, and the assignment; it must be correct for NETPMSA to process your course and give you credit for your work.

Because your ADP answer sheets will not be returned to you, be sure to mark your answers in the course booklet as you are working the course. Whenever you complete an assignment, transfer your answers from the course booklet to the ADP answer sheet.

Mailing the Completed ADP Answer Sheets: Upon completing an assignment, mail the completed answer sheet to:

Commanding Officer
Naval Education and Training
Program Management Support
Activity
Pensacola, FL 32559-5000

Use envelopes to mail your answer sheets. You must provide your own envelopes or request them from your local educational services officer (ESO). You may enclose more than one answer sheet in a single envelope. Remember, regardless of how many answer sheets you submit at a time, NETPMSA should receive at least one assignment a month.

NOTE: DO NOT USE THE COURSE COMMENTS PAGE AS AN ENVELOPE FOR RETURNING ANSWER SHEETS OR OTHER COURSE MATERIALS.

Grading: NETPMSA will grade the answer sheets and notify you by letter concerning your grade for each assignment, your incorrect answers, and your final grade. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, you must rework the assignment. NETPMSA will enclose a new ADP answer sheet in the letter notifying you of the questions you answered incorrectly. You will be required to redo the assignment and resubmit the new answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

Course Completion: When you complete the last assignment, fill out the Course Completion form in the back of the course and enclose it with your last answer sheet. NETPMSA will issue you a letter certifying that you satisfactorily completed the course. You should make sure that

credit for the course is recorded in your service record. YOU MAY RETAIN THE TEXT.

NOTE : YOUR OFFICIAL COURSE COMPLETION DATE WILL BE THE DATE YOUR LAST ASSIGNMENT IS PROCESSED THROUGH NETPMSA'S ADP SYSTEM--NOT THE DATE YOU DEPOSIT THE LAST ASSIGNMENT IN THE MAIL. This is especially important if you are taking the course for Naval Reserve retirement credit. You must mail your answer sheets at least 60 days before your anniversary date. This will provide you with enough time for delays in the mail or reworking failed assignments. DO NOT MAIL YOUR ASSIGNMENTS TO THE NAVAL RESERVE PERSONNEL COMMAND (NRPC).

Student Questions: If you have questions concerning this course, notify NETPMSA by mail (use the address on page ii) or by telephone: DSN 922–1366 or commercial (904) 452-1366.

NAVAL RESERVE RETIREMENT CREDIT

If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For the purpose of Naval Reserve retirement, this edition of the course is evaluated at 9 points. These points will be credited to you upon your satisfactory completion of the entire course.

NOTE : YOUR OFFICIAL COURSE COMPLETION DATE WILL BE THE DATE YOUR LAST ASSIGNMENT IS PROCESSED THROUGH NETPMSA'S ADP SYSTEM--NOT THE DATE YOU DEPOSIT THE LAST ASSIGNMENT IN THE MAIL. Refer to the Course Completion paragraph under section B. ADP Answer Sheets.

COURSE OBJECTIVES

By successfully completing this nonresident training course, you will demonstrate mastery of the following subject areas: engineering administration, and engineering fundamentals, the basic steam cycle, boilers, steam turbines, gas turbines, internal–combustion engines, ship propulsion, auxiliary machinery and equipment, instruments, shipboard electrical equipment, and environmental controls.

Naval courses may include several types of questions—multiple-choice, true-false, matching, etc. The questions are not grouped by type but by subject matter. They are presented in the same general sequence as the textbook material upon which they are based. This presentation is designed to preserve continuity of thought, permitting step-by-step development of ideas. Not all courses use all of the types of questions available. The student can readily identify the type of each question, and the action required, by inspection of the samples given below.

MULTIPLE-CHOICE QUESTIONS

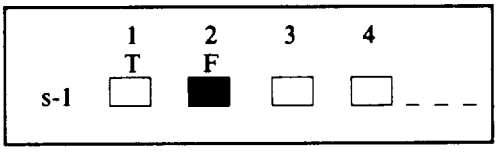
Each question contains several alternatives, one of which provides the best answer to the question. Select the best alternative, and blacken the appropriate box on the answer sheet.

SAMPLE

s-1. Who was the first person appointed Secretary of Defense under the National Security Act of 1947?

1. George Marshall
2. James Forrestal
3. Chester Nimitz
4. William Halsey

Indicate in this way on the answer sheet:



TRUE-FALSE QUESTIONS

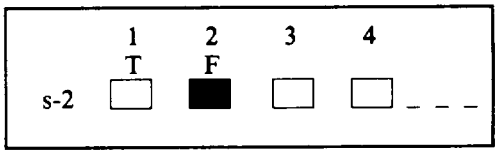
Mark each statement true or false as indicated below. If any part of the statement is false the statement is to be considered false. Make the decision, and blacken the appropriate box on the answer sheet.

SAMPLE

s-2. All naval officers are authorized to correspond officially with any systems command of the Department of the Navy without their respective commanding officer's endorsement.

1. True
2. False

Indicate in this way on the answer sheet:



MATCHING QUESTIONS

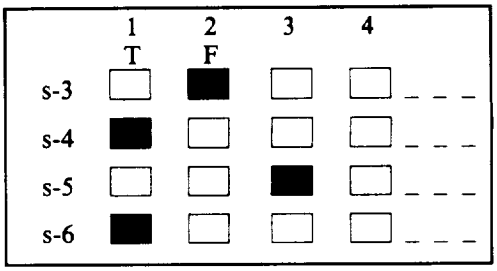
Each set of questions consists of two columns, each listing words, phrases or sentences. The task is to select the item in column B which is the best match for the item in column A that is being considered. Items in column B may be used once, more than once, or not at all. Specific instructions are given with each set of questions. Select the numbers identifying the answers and blacken the appropriate boxes on the answer sheet.

SAMPLE

In questions s-3 through s-6, match the name of the shipboard officer in column A by selecting from column B the name of the department in which the officer functions. Some responses maybe used once, more than once, or not at all.

A. OFFICER	B. DEPARTMENT
s-3. Damage Control Assistant	1. Operations Department
s-4. CIC Officer	2. Engineering Department
s-5. Disbursing Officer	3. Supply Department
s-6. Communications Officer	

indicate in this way on the answer sheet:



A S S I G N M E N T 1

Textbook Assignment: "Engineering Administration," Chapter 1, pages 1-2 through 1-23.

IN ANSWERING QUESTIONS 1-1 THROUGH 1-7, SELECT FROM COLUMN B THE ENGINEERING DEPARTMENT OFFICERS RESPONSIBLE FOR THE DUTIES IN COLUMN A. RESPONSES FROM COLUMN B MAY BE USED MORE THAN ONE TIME.

A. DUTIES	B. OFFICERS
1-1. Directs the division through work center supervisors	1. Engineer officer
1-2. Responsible for the completion of all repairs within the capacity of the shops in the engineering department	2. Training officer
1-3. Administers and executes the ship's electrical safety program	3. Electrical officer
1-4. Responsible for developing a department training program in support of the training objectives of the ship	4. Division officer
1-5. Responsible for the operation, care, and maintenance of all propulsion and auxiliary machinery	
1-6. Maintains the department's training records and training reports	
1-7. Assigns watches and duties within the division	

1-8. The three main assistants to the engineer officer are the main propulsion assistant, the electrical officer, and the

1. damage control assistant
2. training officer
3. division chief petty officer
4. small boat engineer

1-9. Which of the following personnel is responsible for screening the engineering department's incoming correspondence and initiating the required action?

1. The administrative assistant
2. The training officer
3. The damage control assistant
4. The division chief petty officer

1-10. A list of all Navy schools and their requirements can be found in which of the following publication?

1. NSTM, chapter 541
2. NAVEDTRA 10120-J
3. NAVEDTRA 10500
4. NAVEDTRA 10054-F

1-11. The duties and responsibilities of the gas-free engineer are described in what chapter of the Naval Ships' Technical Manual?

1. 221
2. 074
3. 262
4. 504

1-12. What division operates the boilers and fireroom auxiliary machinery?

1. B division
2. M division
3. E division
4. R division

1-13. What division is responsible for keeping the ship watertight?

1. A division
2. B division
3. M division
4. R division

1-14. On steam-driven ships, the oil and water king is either a BT or a/an

1. ML
2. MM
3. EM
4. IC

1-15. What instruction describes the 3-M Systems in detail?

1. OPNAVINST 5100.20-C
2. SECNAVINST 5215.1C
3. OPNAVINST 3120.32B
4. OPNAVINST 4790.4

1-16. What rating is responsible for making wooden, plastic, plaster, and metal patterns?

1. MR
2. IM
3. OM
4. PM

1-17. What is OPNAVINST 5100.19?

1. The 3-M Manual
2. The SORM
3. The NSTM
4. Navy Safety Precautions for Forces Afloat

1-18. Firemen, Enginemen, or Machinist's Mates are detailed as boat engineers from what division?

1. B division
2. A division
3. M division
4. R division

1-19. Which of the following ratings is responsible for operating, maintaining, and repairing reciprocating engines?

1. EN
2. IC
3. MR
4. OM

1-20. What officer is responsible for the safety of the entire command?

1. The engineering officer of the watch
2. The engineer officer
3. The executive officer
4. The commanding officer

1-21. DANGER tags are what color?

1. Orange
2. Black
3. Red
4. Yellow

1-22. CAUTION tags are what color?

1. Green
2. Yellow
3. Red
4. Purple

1-23. OUT-OF-CALIBRATION labels are what color?

1. Orange
2. Red
3. Yellow
4. Brown

1-24. OUT-OF-COMMISSION labels are what color?

1. Orange
2. Yellow
3. White
4. Red

1-25. When a Ship is in port, an audit of the tag-out log should be conducted by the EDO at least how often?

1. Every week
2. Every 2 weeks
3. Every 3 weeks
4. Every month

1-26. When a ship is in the yards, an audit of the tag-out log should be conducted by the EDO at least how often?

1. Every week
2. Every 2 weeks
3. Every 3 weeks
4. Every month

1-27. The EOSS was developed by which of the following commands?

1. OPNAV
2. NMPC
3. NAVSEA
4. CNET

1-28. The EOSS involves the participation of which of the following personnel?

1. Department heads only
2. Watch standers only
3. Enginemen only
4. All personnel from the department head to the watch stander

1-29. The EOSS was designed for which of the following purposes?

1. To improve the operational readiness of the ship’s engineering plant
2. To increase operational efficiency and provide better engineering plant control
3. To reduce operational casualties and extend equipment life
4. All of the above

1-30. The EOSS is composed of which of the following parts?

1. The User’s Guide
2. The engineering operational procedures
3. The engineering operational casualty control
4. All of the above

1-31. The administrative organization for all types of ships is prescribed in which of the following instruction?

1. OPNAVINST 5100.23B
2. OPNAVINST 3120.32B
3. OPNAVINST 4790.4B
4. SECNAVINST 5216.5C

1-32. The ultimate responsibility for organization of the officers and crew of a ship belongs to which of the following officers?

1. The administrative officer
2. The engineer officer
3. The executive officer
4. The commanding officer

1-33. Which of the following ratings is responsible for operating, maintaining, and repairing gyrocompasses, alarms, and voice interior communication systems?

1. EM
2. EN
3. IC
4. IM

1-34. The GS rating is divided into how many groups?

1. One
2. Two
3. Three
4. Four

1-35. Which of the following ratings is responsible for performing preventive and corrective maintenance on Navy timepieces?

1. IM
2. IC
3. EM
4. OM

IN ANSWERING QUESTIONS 1-36 THROUGH 1-42, SELECT FROM COLUMN B THE PERSONNEL RESPONSIBLE FOR THE DUTIES IN COLUMN A. RESPONSES FROM COLUMN B MAY BE USED MORE THAN ONE TIME.

A. DUTIES	B. PERSONNEL RESPONSIBLE
1-36. Assists the division officer in coordinating and administering the division	1. Damage control asaistant 2. Administrative asstsiatant 3. Main propulsion assistant
1-37. Functions as an aid to the engineer officer in the details of administration	4. Division CPO
1-38. Responsible for control of the ship's stability, list, and trim	
1-39. In charge of the A and R division shops	
1-40. Responsible for the preparation and care of the Engineering Log and Engineer's Bell Book	
1-41. Responsible for the care, stowage, and use of fuels and lubricating oils	
1-42. Supervises the maintenance of department records and maintains a tickler file on all required reports	

1-43. The planned maintenance system was established for which of the following purposes?

1. To describe the methods and tools to be used on a job
2. To plan and schedule maintenance tasks
3. To estimate and evaluate material readiness
4. All of the above

1-44. What is the primary objective of the Ships' 3-M Systems?

1. To provide for managing maintenance and maintenance support in a way to ensure maximum equipment operational readiness
2. To ensure that hazardous conditions do not exist in a working area
3. To ensure 100% availability of all shipboard systems
4. To ensure that all ships are properly manned with the appropriate ratings

1-45. The use of DANGER or CAUTION tags is NOT a substitute for other safety measures, such as locking valves or pulling fuses.

1. True
2. False

1-46. Normally, which of the following personnel fills out and signs the record sheet and prepares the tags?

1. The commanding officer
2. The executive officer
3. The petty officer in charge of the work
4. The engineer officer

1-47. What type of tag or label is used to prohibit the operation of equipment that could jeopardize the safety of personnel or endanger equipment?

1. A red DANGER tag
2. A yellow CAUTION tag
3. An OUT-OF-CALIBRATION label
4. An OUT-OF-COMMISSION label

1-48. As a Fireman, you will NOT be required to stand watches in engineering spaces.

1. True
2. False

1-49. Which of the following watches is in charge of the main propulsion plant and associated auxiliaries?

1. The throttle watch
2. The EOOW
3. The DCC watch
4. The cold-iron watch

1-50. A burnerman is responsible for all EXCEPT which of the following duties?

1. Cutting burners in and out as directed by the BTOW
2. Changing atomizers when authorized by the BTOW
3. Lighting fires or cutting in additional burners
4. Changing the speed of the ship's propellers

1-51. Which of the following watches constantly checks the pressures, temperatures, vacuum, and salt content of the distilled water aboard the ship?

1. The evaporator watch
2. The shaft alley watch
3. The cold-iron watch
4. The messenger of the watch

1-52. Who is responsible for preparing the watch, quarter, and station bill for a division?

1. The commanding officer
2. The executive officer
3. The command duty officer
4. The division officer

IN ANSWERING QUESTIONS 1-53 THROUGH 1-58, SELECT FROM COLUMN B THE ENGINEERING WATCHES RESPONSIBLE FOR THE DUTIES IN COLUMN A. RESPONSES FROM COLUMN B MAY BE USED MORE THAN ONE TIME.

A. DUTIES	B. ENGINEERING WATCHES
1-53. Checks all sea valves after working hours when the ship is in dry dock	1. Throttle watch
1-54. Usually assigned as the sound-powered telephone talker when the ship is undergoing close maneuvering conditions with other ships, entering or leaving port, or refueling or replenishing from another ship	2. Sounding and security watch
1-55. Functions as the ship's first line of defense in maintaining watertight integrity while on watch	3. Messenger of the watch
1-56. Complies with orders from the bridge concerning the movement of the ship's propellers	4. Cold-iron watch
1-57. Primary mission is to look for fire and flooding hazards	
1-58. Ensures that weights, such as fuel oil or feedwater, are NOT shifted without permission of the engineer officer or DCA	

1-59. Which of the following publications will provide you with information about the watch, quarter, and station bill?

1. Naval Ships' Technical Manual, chapter 541
2. Catalog of Training Courses
3. Basic Military Requirements
4. The Advancement Handbook for Petty Officers

1-60. You will generally find which of the following information on the watch, quarter, and station bill?

1. Watch assignments for each person under various conditions of readiness
2. The station and job each person will have in emergency situations
3. A listing of each person as to billet number, locker number, bunk number, compartment number, name, rating, and rate
4. All of the above

ASSIGNMENT 2

Textbook Assignment: "Engineering Fundamentals," chapter 2, pages 2-1 through 2-20, and "Basic Steam Cycle," chapter 3, pages 3-1 through 3-6.

2-1. Matter is defined as anything that occupies space and has

1. color
2. weight
3. motion
4. electrical energy

2-2. Which of the following substances CANNOT be reduced to a simpler substance by chemical means?

1. An element
2. A compound
3. A gas
4. A molecule

2-3. When two or more elements are chemically combined, what is the resulting substance called?

1. An atom
2. A solid
3. A mixture
4. A compound

2-4. A combination of elements and compounds that are not chemically combined and can be separated by physical means is known as a

1. compound
2. molecule
3. mixture
4. gas

2-5. A molecule is a chemical combination of which of the following parts?

1. Two or more atoms
2. Two or more compounds
3. A liquid and a solid
4. An element and a compound

2-6. The smallest particle of an element that retains the characteristic of that element is known by what term?

1. A compound
2. A molecule
3. A mixture
4. An atom

2-7. The electron and proton each have the same quantity of charge, although the mass of the proton is about how many times that of the electron?

1. 1028
2. 1500
3. 1837
4. 3000

2-8. An atom of hydrogen, which contains one proton and one electron, has what atomic number?

1. One
2. Two
3. Three
4. Four

2-9. Which of the following equipment use(s) magnetic tape?

1. Computers
2. Tape recorders
3. Video reproduction equipment
4. All of the above

2-10. Electric motors use magnets to convert mechanical energy into what other type of energy?

1. Heat energy
2. Solar energy
3. Electrical energy
4. Chemical energy

2-11. Which of the following materials is magnetic?

1. Cobalt
2. Tin
3. Glass
4. Wood

2-12. On the Fahrenheit scale, what is the boiling point of pure water?

1. 32°F
2. 100°F
3. 102°F
4. 212°F

2-13. On the Celsius scale, what is the freezing point of pure water?

1. 0°C
2. 32°C
3. 100°C
4. 212°C

2-14. What Celsius temperature is equivalent to 212°F?

1. 32°C
2. 100°C
3. 180°C
4. 212°C

2-15. On the Celsius scale, what is absolute zero?

1. -100°C
2. -212°C
3. -213°C
4. -300°C

2-16. What type of pressure is actually shown on the dial of a gauge that registers pressure relative to atmospheric pressure?

1. Absolute pressure
2. Barometric pressure
3. Atmospheric pressure
4. Gauge pressure

2-17. At sea level, what is the average atmospheric pressure in inches of mercury?

1. 29.92 in.Hg
2. 30.00 in.Hg
3. 39.92 in.Hg
4. 40.12 in.Hg

2-18. What term is used to describe the actual atmospheric pressure that exists at any given moment?

1. Absolute pressure
2. Positive pressure
3. Gauge pressure
4. Barometric pressure

2-19. Which of the following vacuum gauge readings would indicate a nearly perfect vacuum?

1. 28.92 in.Hg
2. 29.92 in.Hg
3. 30.00 in.Hg
4. 31.92 in.Hg

2-20. What is absolute pressure?

1. Atmospheric pressure minus gauge pressure
2. Atmospheric pressure plus gauge pressure
3. Absolute pressure plus vacuum
4. Gauge pressure plus vacuum

2-21. A gauge pressure of 300 psig equals approximately what absolute pressure?

1. 314.7 psia
2. 324.7 psia
3. 330.7 psia
4. 344.7 psia

2-22. What term refers to the property of a metal that allows It to shatter easily?

1. Toughness
2. Brittleness
3. Strength
4. Hardness

2-23. What term refers to the property of a metal that will NOT permit it to tear or shear easily?

1. Toughness
2. Brittleness
3. Strength
4. Hardness

2-24. What term refers to the ability of a metal to stretch or bend without breaking?

1. Toughness
2. Brittleness
3. Strength
4. Ductility

2-25. What term refers to the ability of a metal to maintain heavy loads without breaking?

1. Toughness
2. Strength
3. Hardness
4. Ductility

2-26. What term refers to the property of a metal that allows it to be rolled, forged, hammered, or shaped without cracking or breaking?

1. Malleability
2. Ductility
3. Strength
4. Toughness

2-27. Metals and alloys are divided into which of the following general classes?

1. Light and heavy
2. Hard and soft
3. Smooth and rough
4. Ferrous and nonferrous

2-28. What are the two systems used by the Navy to identify metals?

1. The color marking system and the weight system
2. The numbering system and the weight system
3. The continuous identification marking system and the color marking system
4. The continuous identification marking system and the weight system

2-29. Which of the following references contains information on the metals used aboard ship, their properties, and their identification systems?

1. NAVEDTRA 10571-1
2. NAVEDTRA 12061
3. NAVEDTRA 10792-E
4. NAVEDTRA 10925

2-30. Electricity is a combination of a force called voltage and the movement of invisible particles known as

1. resistance
2. friction
3. mass
4. current

2-31. In reference to current, which of the following statements is NOT true?

1. Current is the movement of invisible particles
2. Current causes electrical devices to operate
3. Current cannot be seen
4. Current can flow out of a broken wire

2-32. Ohm’s law is stated as I = E/R, What does I refer to?

1. Voltage in volts
2. Current in amperes
3. Resistance in ohms
4. Pressure in pounds

2-33. Who is the formulator of the basic laws of modern philosophy concerning gravity and motion?

1. Sir Isaac Newton
2. Blaise Pascal
3. George Simon Ohm
4. Jacques Bernoulli

2-34. What does Newton’s third law state?

1. For every action there is an equal and opposite reaction
2. An imbalance of force on a body tends to produce an acceleration in the direction of force
3. A body in motion tends to remain in motion
4. Work is done when an object is moved through a distance against a resisting force

2-35. What term refers to the rate at which velocity increases?

1. Speed
2. Inertia
3. Acceleration
4. Potential energy

2-36. Frictional forces can cause which of the following problems?

1. Waste power
2. Create heat
3. Cause wear
4. All of the above

2-37. Mechanical energy in transition is called

1. heat
2. work
3. motion
4. potential energy

2-38. A sled that is being held at the top of an icy hill has what form of energy?

1. Mechanical potential energy
2. Chemical energy
3. Thermal energy
4. Mechanical kinetic energy

2-39. Which of the following formulas is used to calculate work?

1 . P E = W X D
2 . I = E/R
3 . W = F X D
4 . F = W X D

2-40. In reference to energy, which of the following statements is true?

1. Energy can be destroyed
2. Energy can be created
3. Energy can be transformed
4. The total amount of energy input does not always equal the total amount of energy output

2-41. Steam hotter than the boiling temperature of water is known by which of the following terms?

1. Wet steam
2. Superheated steam
3. Saturated steam
4. Latent heat of fusion

2-42. Thermal energy in transition is called

1. work
2. motion
3. potential energy
4. heat

2-43. What does 32°F equal in Celsius?

1. 0°C
2. 20°C
3. 30°C
4. 32°C

2-44. When the mercury level is at the +10° mark on the Celsius thermometer, it will be at what mark on the Fahrenheit thermometer?

1. +50°
2. +20°
3. +30°
4. +40°

2-45. Whose law, simply stated, is interpreted as pressure exerted at any point upon an enclosed liquid is transmitted undiminished in all directions?

1. Charles's law
2. Pascal's law
3. Boyle's law
4. Newton's law

2-46. What branch of mechanics deals with the mechanical properties of gases?

1. Hydraulics
2. Thermal flow
3. Pneumatics
4. Mechanical potential energy

2-41. What are the four areas of operation in a main steam system?

1. Generation, expansion, condensation, and feed
2. Expansion, condensation, power, and exhaust
3. Generation, expansion, rotation, and feed
4. Condensation, expansion, feed, and pressure

2-48. By the process of combustion in a boiler furnace, the chemical energy stored in the fuel oil is transformed into what other type of energy?

1. Mechanical energy
2. Electrical energy
3. Steam energy
4. Thermal energy

2-49. In the basic steam cycle, when steam enters the turbines and expands, the thermal energy of the steam converts to what other type of energy?

1. Steam energy
2. Mechanical energy
3. Electrical energy
4. Potential energy

2-50. The temperature at which a liquid boils under a given pressure is known by which of the following terms?

1. Saturation pressure
2. Equilibrium contact
3. Saturation temperature
4. Critical point

2-51. The amount by which the temperature of superheated steam exceeds the temperature of saturated steam at the same pressure is known by which of the following terms?

1. Degree of saturated vapor
2. Degree of superheat
3. Degree of saturated pressure
4. Degree of expansion

2-52. As the steam leaves or exhausts from the LP turbine, what system does it enter?

1. The auxiliary exhaust system
2. The condensate system
3. The HP turbine system
4. The main steam system

2-53. The main condenser, the main condensate pump, the main air ejector condenser, and the top half of the DFT are components of what system?

1. The HP turbine system
2. The LP turbine system
3. The condensate system
4. The auxiliary steam system

2-54. The main condenser receives steam from the

1. LP turbine
2. HP turbine
3. main feed pump
4. economizer

2-55. The main feed pump receives the water (delivered from the booster pump) and discharges it into what system?

1. The condensate system
2. The saturated steam system
3. The auxiliary steam system
4. The main feed piping system

2-56. The temperature at which a boiling liquid and its vapors may exist in equilibrium contact depends on which of the following factors?

1. The pressure under which the process takes place
2. The time of day the process takes place
3. The type of container used to hold the boiling liquid
4. The percent of humidity in the air

2-57. Naval boilers produce which of the following types of steam?

1. Saturated steam
2. Superheated steam
3. Both 1 and 2 above
4. Contaminated steam

2-58. The economizer is positioned on a boiler to perform what basic function?

1. It acts as a cooler
2. It reverses the flow of water
3. It acts as a preheater
4. It converts the HP steam into LP steam

2-59. The expansion area of the main steam system is that part of the basic steam cycle in which steam from the boilers to the main turbines is

1. expanded
2. cooled
3. reversed in direction
4. condensed

2-60. The DFT serves which of the following functions?

1. It removes dissolved oxygen and noncondensable gases from the condensate
2. It preheats the water
3. It acts as a reservoir to store feedwater to take care of fluctuations in feedwater demand or condensate supply
4. All of the above

ASSSIGNMENT 3

Textbook Assignment: "Boilers," chapter 4, pages 4-1 through 4-15, and "Steam Turbines," chapter 5, pages 5-1 through 5-1.

3-1. What is the function of a boiler in the steam cycle?

1. To convert water into steam
2. To convert steam into water
3. To convert thermal energy into chemical energy
4. To convert mechanical energy into thermal energy

3-2. Which of the following NSTM chapters contains information on boilers?

1. Chap 079
2. Chap 090
3. Chap 221
4. Chap 554

3-3. What compartment contains the boilers, the station for firing or operating the boilers, and the main propulsion engines?

1. The boiler room
2. The main machinery room
3. The fireroom
4. The boiler operating station

3-4. What term refers to the time during which the boilers have fires lighted until the fires are secured?

1. Steam drum pressure
2. Design temperature
3. Superheater outlet pressure
4. Steaming hours

3-5. Boiler overload capacity is usually what percent of boiler full-power capacity?

1. 100%
2. 110%
3. 120%
4. 130%

3-6. Which of the following terms refers to the actual temperature at the superheater outlet?

1. Design temperature
2. Operating temperature
3. Total heating 'surface temperature
4. Economizer surface temperature

3-7. As far as boilers are concerned, what is the only distinction between a drum and a header?

1. Size
2. Color
3. Headers may be entered by a person
4. Drums may not be entered by a person

3-8. Which of the following components can be found on boilers used onboard naval ships?

1. Steam and water drums
2. Generating and circulating tubes
3. Superheaters and economizers
4. All of the above

3-9. During normal operation, the water in the steam drum is kept at approximately what level?

1. Full
2. 1/2 full
3. 1/3 full
4. 1/4 full

3-10. In reference to the water drum, which of the following statements is accurate?

1. The water drum is the same size as the header
2. The water drum is larger than the steam drum
3. The water drum is smaller than the header
4. The water drum is larger than the header

3-11. Downcomers range in diameter from 3 inches to

1. 9 inches
2. 8 inches
3. 6 inches
4. 4 inches

3-12. Generating tubes are made of what type of metal?

1. Steel
2. Copper
3. Brass
4. Tin

3-13. The surface blow pipe is used for which of the following purposes?

1. To remove suspended solid matter that floats on top of the water
2. To lower the steam drum water level
3. To blow water out to lower the chemical level in the boiler when it becomes too high
4. All of the above

3-14. How many people are required during boiler light off?

1. One
2. Two
3. Three
4. Four

3-l5. In reference to boiler design pressure, which of the following statements is accurate?

1. Design pressure is the same as operating pressure
2. Design pressure is lower than operating pressure
3. Design pressure is not given in the manufacturer’s technical manual for a particular boiler
4. Design pressure is the maximum pressure specified by the boiler manufacturer as a criterion for boiler design

3-16. Why are single-furnace boilers often referred to as D-type boilers?

1. They are manufactured by the Delta Manufacturing Company
2. The tubes form a shape that looks like the letter D
3. The steam and water always flow down
4. The D indicates a double boiler-wall thickness

3-17. In naval propulsion plants, where are the burners usually located?

1. At the front of the boiler
2. At the back of the boiler
3. On the right side of the boiler
4. On the left side of the boiler

3-18. On almost all boilers used in the propulsion plants of naval ships, what protects the superheater tubes from radiant heat?

1. Water screen baffles
2. Insulating block
3. Air tubes
4. Water screen tubes

3-1. What is the approximate operating pressure range for header-type boilers?

1. 300 to 425 psi
2. 435 to 700 pal
3. 700 to 825 pal
4. 825 to 925 psi

3-20. What tubes lead from the water drum to the steam drum?

1. Generating tubes
2. Sidewall tubes
3. Superheater tubes
4. Water wall tubes

3-21. Which of the following are used to reduce the swirling motion of the water as it enters the downcomers?

1. Scrubbers
2. Screen plates
3. Vortex eliminators
4. Steam separators

3-22. Where does the steam go after it leaves the scrubbers?

1. To the cyclone steam separator
2. To the front vortex eliminator
3. To the surface blow pipe
4. To the dry pipe

3-23. Which of the following devices break up the fuel into very fine particles?

1. Atomizers
2. Diffuser plates
3. Air foils
4. Baffles

3-24. Hero designed and built which of the following types of engines?

1. Gas-powered
2. Electric-powered
3. Steam-powered
4. Solar-powered

3-25. Hero’s turbine (aeolipile) consists of a hollow sphere with a total of how many canted nozzles?

1. One
2. Two
3. Three
4. Four

3-26. The water wheel that was used to operate the flour mills in colonial times and the common windmill used to pump water are examples of what principle?

1. The turbine principle
2. The reciprocating engine principle
3. The solar energy principle
4. The gravity flow principle

3-27. What two methods are used in turbine design and construction to get the desired results from a turbine?

1. Steam and rotary principles
2. Rotary and reciprocating
3. Impulse and reaction principles
4. Reaction and rotary principles

3-28. The energy to rotate an impulse turbine is derived from what source?

1. The potential energy of the heat flowing through the nozzles
2. The kinetic energy of the steam flowing through the turbine shaft
3. The mechanical energy of the turbine shaft derived from the atomizers
4. The kinetic energy of the steam flowing through the nozzles

3-29. As the steam passes through a nozzle, potential energy is converted into what other type of energy?

1. Mechanical potential energy
2. Kinetic energy
3. Thermal energy
4. Chemical energy

3-30. Impulse turbines may be used to drive which of the following equipment?

1. Forced draft blowers
2. Pumps
3. Main propulsion turbines
4. All of the above

3-31. Hero’s turbine was invented long before Newton’s time, but It was a working model of Newton’s

1. first law of motion
2. second law of motion
3. third law of motion
4. fourth law of motion

3-32. What does a reaction turbine use to drive the rotor?

1. The reaction of a steam jet
2. The reaction of a gas when converted to a solid
3. The reaction of a water jet
4. The reaction of a rapid change in steam temperature

3-33. What is generally stated in Newton’s third law of motion?

1. For every action there must be an equal and opposite reaction
2. Matter can be neither created nor destroyed
3. The total quantity of energy in the universe is always the same
4. At the molecular or submolecular level, heat transfer takes place through both the processes of conduction and radiation

3-34. In a reaction turbine, the stationary blades attached to the turbine casing act as nozzles and direct the steam to the

1. shaft
2. bearings
3. baffles
4. moving blades

3-35. When you let the air escape through the small opening in a balloon, what energy transformation is taking place?

1. Kinetic energy to potential energy
2. Potential energy to kinetic energy
3. Thermal energy to chemical energy
4. Mechanical energy to kinetic energy

3-36. A reaction turbine has all the advantages of an Impulse-type turbine, plus which of the following features?

1. A slower operating speed
2. Greater efficiency
3. Both 1 and 2 above
4. A faster operating speed

3-37. For nonsuperheated applications, turbine casings are made from which of the following materials?

1. Cast carbon steel
2. Brass
3. Tin
4. Plastic

3-38. For superheated applications, turbine casings are made from which of the following materials?

1. Carbon molybdenum steel
2. Cast carbon steel
3. Brass
4. Cast iron

3-39. What is the primary purpose of a turbine rotor?

1. To carry the moving blades that convert the steam’s kinetic energy to rotating mechanical energy
2. To convert mechanical energy to potential energy
3. To carry the stationary blades that convert the steam’s kinetic energy to chemical energy
4. To convert kinetic energy to hydraulic energy

3-40. The rotor of every turbine must be positioned radially and axially by what means?

1. Brushes
2. Wedges
3. Spaces
4. Bearings

3-41. Bearings are generally classified in which of the following ways?

1. Rotating or stationary
2. Stationary surface or rotating
3. Sliding surface or rolling contact
4. Hard or soft

3-42. Which of the following devices are used to prevent the leaking of steam out of or air into the turbine casing where the turbine rotor shaft extends through the turbine casing?

1. Rubber gaskets
2. Baffles
3. Steam deflectors
4. Shaft packing glands

3-43. Carbon packing rings mount around the turbine shaft and are held in place by which of the following devices?

1. Springs
2. Spacers
3. Washers
4. Bolts

3-44. Normally, what does the term “superheat control boiler” identify?

1. A single-furnace boiler
2. A double-furnace boiler
3. An auxiliary boiler
4. A natural-circulation boiler

3-45. The steam drum is a cylinder located at what boiler position?

1. At the top of the boiler
2. At the bottom of the boiler
3. On the left side of the boiler
4. On the right side of the boiler

3-46. How are headers on a boiler identified?

1. By their shape
2. By their size
3. By their location
4. By their color

3-47. The bottom blowdown valves should never be opened on a steaming boiler for which of the following reasons?

1. The circulation of the steam cycle will be interrupted
2. The insulating firebrick will be damaged
3. The baffle material will warp
4. The air casing will crack

3-48. At each end of the steam drum are a number of large tubes that lead to the water drum and sidewall header. What are these tubes called?

1. Sidewall tubes
2. Generating tubes
3. Bottom blow tubes
4. Downcomers

3-49. The sidewall (water wall) tubes in a boiler serve what function?

1. They heat the side wall of the furnace
2. They cool and protect the aide wall of the furnace
3. They cool and protect the soot blower
4. They heat the plastic chrome ore

3-50. The cyclone steam separators remove moisture from the steam, how is this accomplished?

1. By the steam flowing in a straight path
2. By an internal fan or blower
3. By the up and down movement of the separators
4. By the steam spinning or changing direction

3-51. In some boilers, the superheater headers are installed parallel with the water drum and the tubes are installed vertically, What are these superheaters called?

1. Parallel superheaters
2. Horizontal superheaters
3. Vertical superheater
4. Modified superheaters

3-52. As steam passes through the desuperheater, it is cooled for use in which of the following systems?

1. The economizer
2. The auxiliary steam systems
3. The main steam system
4. The water wall tubes

3-53. The desuperheater may be located either in the steam drum or what other location?

1. The water drum
2. The economizer
3. The registers
4. The ductwork

3-54. The furnace, or firebox, is the large space where air and fuel are mixed for the fire that heats the water in which of the following components?

1. Drums
2. Tubes
3. Headers
4. All of the above

3-55. A forced draft blower is a large volume fan that can be powered by an electric motor or what other source?

1. A gas-driven engine
2. A two-stage hydraulic motor
3. A steam turbine
4. An auxiliary

3-56. The return-flow atomizer provides a constant supply of fuel-oil pressure. Any fuel oil not needed to meet steam demand is returned to what location?

1. The whirling chamber
2. The fuel-oil service tank
3. The economizer
4. The desuperheater

3-57. The vented-plunger atomizer is unique in that it is the only atomizer in use in the Navy that has which of the following features?

1. Moving parts
2. Stationary parts
3. A steam supply
4. An oil supply

3-58. In most boilers, what is used to light fires?

1. A firing cap
2. Flint
3. A torch
4. Friction igniters

3-59. For specific instructions on boiler light-off procedures, what should you refer to?

1. NSTM, Chap 555
2. Your ship’s EOSS
3. NSTM, Chap 505
4. NAVOSH Program Manual

3-60. For information on auxiliary boilers, you should refer to which of the following publications?

1. NSTM, Chap 555
2. NSTM, Chap 505
3. NSTM, Chap 254
4. NSTM, Chap 221

ASSIGNMENT 4

Textbook Assignment: "Gas Turbines," chapter 6, pages 6-1 through 6-20, and "Internal Combustion Engines," chapter 7, pages 7-1 through 7-14.

4-1. The patent application for the gas turbine, as we know it today, was submitted in 1930 by what person?

1. Sir Frank Whittle
2. Christian Huygens
3. Thomas Young
4. Augustin Fresnel

4-2. The United States entered the gas turbine field in what year?

1. 1910
2. 1941
3. 1953
4. 1961

4-3. The first jet aircraft was flown in the United States in what year?

1. 1910
2. 1920
3. 1931
4. 1942

4-4. The U.S. Navy entered the marine gas turbine field with which of the following types of ships?

1. Aircraft carriers
2. Battleships
3. Patrol gunboats
4. Destroyers

4-5. What is basically stated in Newton's third law of motion?

1. For every reaction there is an equal and opposite action
2. For every action there is an unequal and opposite reaction
3. For every unequal action there is an unequal reaction
4. For every action there is an equal and opposite reaction

4-6. The Otto cycle consists of how many basic events?

1. One
2. Two
3. Three
4. Four

4-7. What are the two primary means of classifying gas turbine engines?

1. By the type of compressor used and how the power is used
2. By the type of pistons used and how the power is used
3. By the type of fuel used and the weight
4. By the length of the engines and their rated horsepower

4-8. Most gas turbines of modern design use what type of compressor?

1. Single-entry
2. Dual-entry
3. Triple-entry
4. Single-stage

4-9. In the axial-flow engine, where is the compressor located?

1. On the side of the engine
2. At the rear of the engine
3. At the front of the engine
4. On top of the engine

4-10. What are the three basic types of gas turbines in use?

1. Dual shaft, twin spool, and split end
2. Single spool, common shaft, and split shaft
3. Single shaft, split end, and twin spool
4. Single shaft, split shaft, and twin spool

4-11. In current U.S. Navy service, the single-shaft turbine engine is used primarily for what purpose?

1. Driving ship’s service generator
2. Propelling aircraft carrier
3. Driving auxiliary steam compressors
4. Propelling small boats

4-12. What are the four major sections of a gas turbine engine?

1. Compressor, igniter, turbine, and hydraulic
2. Compressor, auxiliary, combustor, and turbine
3. Compressor, combustor, turbine, and accessory
4. Turbine, auxiliary, hydraulic, and compressor

4-13. What are the three types of combustion chambers?

1. Hot air, forced draft, and stationary
2. Can, annular, and can-annular
3. Closed, open, and stationary
4. Dual shaft, twin spool, and annular

4-14. The annular combustion liner is usually found on what type of engines?

1. Dual-compressor
2. Axial-flow
3. Single-stage
4. Dual-stage

4-15. In theory, design, and operating characteristics, the turbines used in gas turbine engines are quite similar to the turbines used in

1. an electrical power generating system
2. a reciprocating power plant
3. an emergency generator
4. a steam plant

4-16. The ship’s propulsion plant can be operated from which of the following stations?

1. The local control console
2. The central control console
3. The ship control console
4. All of the above

4-17. When compared to other engines, what is the gas turbine’s greatest asset?

1. Its low fuel consumption
2. Its high power-to-weight ratios
3. Its low maintenance cost
4. It ability to resist corrosion

4-18. Internal combustion engines convert heat energy into what other type of energy?

1. Mechanical energy
2. Hydraulic energy
3. Electrical energy
4. Potential energy

4-19. The back-and-forth motion of the pistons in an engine is known as

1. combustion motion
2. mechanical motion
3. reciprocating motion
4. rotary motion

4-20. In the internal combustion engine, what changes reciprocating motion to rotary motion?

1. A crankshaft
2. A connecting rod
3. Both 1 and 2 above
4. A piston

4-21. Which of the following parts will NOT be found on a diesel engine?

1. Pistons
2. Valves
3. Spark plugs
4. Connecting rods

4-22. In the internal combustion engine, what are the four basic strokes?

1. Intake, extension, power, and exhaust
2. Intake, compression, power, and exhaust
3. Intake, reduction, expansion, and exhaust
4. Compression, expansion, extension, and power

4-23. On a four-stroke engine, the camshaft turns at one-half

1. piston speed
2. push rod speed
3. timing gear speed
4. crankshaft speed

4-24. In a four-stroke engine, how many crankshaft revolutions are required to complete one cycle?

1. One
2. Two
3. Three
4. Four

4-25. In a four-stroke engine, how many piston strokes are required to complete one cycle?

1. One
2. Two
3. Three
4. Four

4-26. In a four-stroke engine, each piston makes one power stroke for each

1. revolution of the crankshaft
2. two revolutions of the crankshaft
3. three revolutions of the crankshaft
4. four revolutions of the crankshaft

4-27. In a four-stroke engine, the intake valve is open and the exhaust valve is closed during what piston stroke?

1. Intake
2. Compression
3. Power
4. Exhaust

4-28. In a diesel engine, a charge of fuel is forced into the cylinder when the piston nears the top of what stroke?

1. Intake
2. Compression
3. Power
4. Exhaust

4-29. In a gasoline engine, the fuel air mixture is ignited by a spark plug near the top of what piston stroke?

1. Intake
2. Compression
3. Power
4. Exhaust

4-30. In a two-stroke diesel engine, how often in the cycle does the power stroke occur?

1. Every stroke
2. Every second stroke
3. Every third stroke
4. Every fourth stroke

4-31. Which of the following parts will NOT be found in a two-stroke engine?

1. Pistons
2. Exhaust valves
3. Intake valves
4. Cylinders

4-32. In a four-stroke engine, how fast does the camshaft turn in relation to the crankshaft?

1. 1/2 as fast as the crankshaft
2. 1/3 as fast as the crankshaft
3. 1/4 as fast as the crankshaft
4. 1/8 as fact as the crankshaft

4-33. The relation between the volume of the cylinder with the piston at the bottom of its stroke and the cylinder volume with the piston at the top of its stroke is called the

1. displacement ratio
2. travel ratio
3. stroke length
4. compression ratio

4-34. As the compression ratio is increased, what, if anything, happens to the temperature of the air in the cylinder?

1. It decreases
2. It increases
3. It decreases rapidly, then increases
4. Nothing

4-35. Current gasoline engines operate at which of the following compression ratios?

1. Between 6:1 and 11:1
2. Between 11:1 and 12:5
3. Between 12:5 and 13:1
4. Between 13:1 and 14:5

4-36. Current diesel engines operate at which of the following compression ratios?

1. Between 10:1 and 11:1
2. Between 11:1 and 12:1
3. Between 12:1 and 19:1
4. Between 19:1 and 20:5

4-37. The lubricating system of an engine delivers oil to the moving parts for which of the following purposes?

1. To reduce friction
2. To assist in keeping the parts cool
3. To prevent serious damage to engine parts
4. All of the above

4-38. Most diesel and gasoline engines are equipped with what type of lubricating system?

1. Splash
2. Pressure
3. Gravity feed
4. Immersion

4-39. To carry away the excess heat produced in the engine cylinders, marine engines are equipped with what type of cooling system?

1. Oil
2. Water
3. Alcohol
4. Air

4-40. Which of the following types of starting systems are used in internal combustion engines?

1. Electric
2. Hydraulic
3. Compressed air
4. All of the above

4-41. Electric starting systems in internal combustion engines use which of the following types of current?

1. Direct current
2. Alternating current
3. Magnetic current
4. All of the above

4-42. What are the two distinct circuits in the ignition system of a gasoline engine?

1. Alternating and direct
2. Mechanical and electric
3. Primary and secondary
4. Hot and cold

4-43. Which of the following events happens at the exact instant that a cylinder is due to fire in a gasoline engine?

1. The ignition breaker points open
2. The ignition breaker points close
3. Fuel is injected directly into the cylinder
4. The intake valve closes

4-44. On a gasoline engine, the distributor is connected to what circuit?

1. Primary
2. Secondary
3. Low-voltage
4. Mechanical

4-45. In a gasoline engine, the high voltage that jumps the gap in the spark plugs comes from what source?

1. The battery
2. The generator
3. The starter
4. The ignition coil

4-46. In an operating gasoline engine system, which of the following happens when the breaker points open?

1. High voltage is produced in the primary circuit
2. Low voltage is produced in the secondary circuit
3. High voltage is produced in the secondary circuit
4. Low voltage is produced in the generator circuit

4-47. In a gasoline engine ignition circuit, what is the primary purpose of the condenser?

1. To protect the breaker points from being burned
2. To produce high-voltage current
3. To reduce the moisture content in the distributor
4. To aid in producing a colder spark

4-48. In electronic ignition systems, what opens and closes the primary circuit?

1. Breaker points
2. A can
3. A mechanical switch
4. An electronic control unit

4-49. What type of energy is contained in fuel for operating engines?

1. Kinetic
2. Potential
3. Pneumatic
4. Hydraulic

4-50. In a diesel engine, which of the following is drawn into the cylinders on the intake stroke?

1. Fresh air
2. Fuel
3. Both 2 and 3 above
4. Oil

4-51. Which of the following controls the speed of a diesel or gasoline engine?

1. The ignition timing
2. The carburetor discharge pressure
3. The valve overlap setting
4. The amount of fuel and air mixture burned in the cylinders

4-52. The push or pressure created in an engine cylinder to move the piston is a result of what action?

1. The reciprocating motion of the connecting rod
2. The rotary motion of the camshaft
3. Burning of a mixture of fuel and air
4. The governor drive assembly

4-53. As the piston nears the bottom of the power stroke in a two-stroke diesel engine, the exhaust valves open and the piston continues downward to

1. uncover the intake ports
2. cover the intake ports
3. uncover the fuel regulator valve
4. cover the exhaust ports

4-54. In many respects, an ignition coil on a gasoline engine ignition system is similar to

1. a battery
2. a condenser
3. an electromagnet
4. a spark plug

4-55. In a gasoline engine ignition system, what prevents arcing across the breaker points?

1. A high tension coil
2. A low tension coil
3. An insulated distributor cap
4. A condenser

4-56. On the compression stroke in a diesel engine, the air is compressed and the temperature in the cylinder will rise to what maximum temperature?

1. 1,200°F
2. 1,100°F
3. 1,000°F
4. 700°F

4-57. Each movement of the piston in an engine from top to bottom or from bottom to top is known by what term?

1. Event
2. Stroke
3. Cycle
4. Transaction

4-58. On some types of engines, the camshaft is located near the crankshaft. In these designs, the action of the cam roller is transmitted to the rocker arm by what means?

1. A spring
2. A lever
3. A push rod
4. A crankshaft

4-59. In the two-stroke engine, the camshaft rotates at what speed in relation to the crankshaft?

1. The camshaft rotates at one-half the speed of the crankshaft
2. The camshaft rotates at twice the speed of the crankshaft
3. The camshaft rotates at four times the speed of the crankshaft
4. The camshaft rotates at the same speed as the crankshaft

4-60. You can find detailed information on compression ignition systems in which of the following publications?

1. NSTM, chap 422
2. NAVEDTRA 10539
3. OPNAVINST 4790.4
4. OPNAVINST 1500.22

ASSIGNMENT 5

Textbook Assignment: "Ship Propulsion," chapter 8, pages 8-1 through 8-8, "Pump, Valves, and Piping," chapter 9, pages 9-1 through 9-49, and "Auxiliary Machinery and Equipment," chapter 10, pages 10-1 through 10-54.

5-1. The primary function of any marine engineering plant is to convert the chemical energy of a fuel into useful work and use that work for what purpose?

1. Propulsion of the ship
2. Decontamination of the ship
3. Operation of hydraulic clutches
4. Production of steam

5-2. What type of propeller is used in most naval ships?

1. Gear
2. Paddle
3. Thrust
4. Screw

5-3. Steam propulsion-type ships built since 1935 have what type of propulsion gears?

1. Single reduction
2. Double reaction
3. Double reduction
4. High-speed reaction

5-4. Pneumatic clutches with a cylindrical friction surface are used with engines up to what maximum horsepower?

1. 1,000 hp
2. 2,000 hp
3. 3,000 hp
4. 4,000 hp

5-5. What are the two general styles of friction clutches?

1. hydraulic and mechanical
2. Disk and band
3. Hard and soft
4. Gear and rod

5-6. What are the two general types of friction clutches?

1. Dry and wet
2. Hard and soft
3. Disk and band
4. Air and hydraulic

5-7. A screw propeller may be broadly classified by which of the following terms?

1. Single pitch or double pitch
2. Stationary angle or variable angle
3. Fixed pitch or controllable pitch
4. Stationary pitch or variable rotation

5-8. Classification of centrifugal pumps is based on which of the following factors?

1. Self-priming ability
2. Positive displacement
3. Number of impellers
4. Position of moving vanes

5-9. The sidewalls of a closed impeller extend from what point to what other point?

1. (a) The eye
   (b) outer edge of vane tips
2. (a) Suction line
   (b) wearing rings
3. (a) Stuffing box
   (b) the eye
4. (a) The water seal
   (b) discharge line

5-10. High-speed impellers must be balanced to avoid vibration. What is the purpose of a close radial clearance between the outer hub and the pump casing?

1. To decrease friction
2. To decrease axial thrust
3. To minimize leakage from the suction side
4. To minimize leakage from the discharge side

5-11. What is the function of mechanical seals and stuffing boxes?

1. To improve pump operation
2. To seal between the shaft and the casing
3. To clean bilges
4. To prevent liquid from being pumped

5-12. What type of pump is considered to be nonpositive displacement?

1. Sliding vane
2. Rotary
3. Centrifugal
4. Jet

5-13. A pump that does not develop enough discharge pressure could have which of the following problems?

1. Clogged impeller passages
2. A bent shaft
3. Excessive suction lift
4. Insufficient pump speed

5-14. Which of the following statements about a centrifugal pump is true?

1. It is essentially self-priming
2. It loses no energy
3. It is a positive-displacement pump
4. It requires a relief valve

5-15. What type of pump has no moving parts?

1. Screw
2. Jet
3. Gear
4. Sliding vane

5-16. What device uses feedback to provide automatic control of speed, pressure, or temperature?

1. Regulating valve
2. Flange coupling
3. Proportional-flow filter
4. Governor

5-17. What is the purpose of a valve in a closed system?

1. To sample fluids
2. To control fluids
3. To increase fluid pressure
4. To decrease fluid pressure

5-18. Brass and bronze valves are never used in systems that exceed what maximum temperature?

1. 450°F
2. 550°F
3. 650°F
4. 750°F

5-19. There are many different types of valves that can be used to control fluid flow. What are the two basic groups of valves?

1. Globe and check
2. Check and gate
3. Stop and check
4. Gate and globe

5-20. Due to valve design, gate valves are not used for throttling purposes for which of the following reasons?

1. They make it difficult to control fluid flow and can damage valves
2. They make it difficult to control fluid flow and are too lightweight
3. They can damage valves and are too lightweight
4. They make it difficult to control fluid flow and are excessively expensive

5-21. In how many directions will a check valve allow fluid to flow?

1. One
2. Two
3. Three
4. Four

5-22. What type of valve requires a 90-degree turn to operate the valve in either the completely open or closed position?

1. Check valve
2. Gate valve
3. Ball valve
4. Butterfly valve

5-23. If a constant-pressure pump governor is attached to a gear pump, to which of the following parts is the governor connected?

1. The driving gear
2. The driven gear
3. The suction line
4. The discharge line

5-24. You can close a butterfly valve by using which of the following procedures?

1. Depress a push button
2. Lift up on a handle
3. Turn the handle one-fourth turn
4. Turn the handle one-half turn

5-25. Whether a stop-check valve acts as a stop valve or as a check valve is determined by which of the following factors?

1. The position of the control lever
2. The direction of the flow
3. The type of disk installed
4. The position of the valve stem

5-26. In a piping system, relief valves automatically open when what factor has been exceeded?

1. The temperature
2. The pressure
3. The flow
4. The circulation

5-27. Reducing valves in reduced pressure systems are designed to be used for which of the following purposes?

1. To prevent damage to the lines due to excessive pressure
2. To provide a steady pressure lower than the supply pressure
3. To vary the operating pressure and the supply pressure
4. Each of the above

5-28. Fuel oil suction may be taken from one of many sources and discharged to another unit or units of the same group by what device?

1. Priority valve
2. Globe valve
3. Valve manifold
4. Operating lever

A.	STEAM
B.	SEWAGE
C.	POTABLE WATER
D.	HELIUM/OXYGEN

Figure 5A

IN ANSWERING QUESTIONS 5-29 THROUGH 5-31, REFER TO FIGURE 51 AND SELECT THE FLUID THAT CORRESPONDS TO THE COLOR CODE FOR VALVE HANDWHEELS AND OPERATING LEVERS .

5-29. Gold.

1. A
2. B
3. C
4. D

5-30. Striped buff/green.

1. A
2. B
3. C
4. D

5-31. Dark blue.

1. A
2. B
3. C
4. D

5-32. What method is used to visually determine whether the seat and the disk of a valve make good contact?

1. Seating-in
2. Spotting-in
3. Grinding-in
4. Lapping

5-33. What manual process should you use to remove small valve seat and disk irregularities?

1. Seating-in
2. Spotting-in
3. Grinding-in
4. Lapping

5-34. Which of the following devices are designed to drain condensate from steam lines without allowing steam to escape?

1. Steam stops
2. Condensate drain valves
3. Filters and strainers
4. Steam traps

5-35. What device has the function of retaining insoluble contaminants by use of some porous medium?

1. A strainer
2. A filter
3. A trap
4. An element

5-36. To determine the size of tubing, which of the following measurements is used?

1. The actual inside diameter
2. The nominal outside diameter
3. The nominal outside circumference
4. The nominal inside circumference

5-37. Resistance to corrosion and the ability to withstand high pressure and temperature are important factors in choosing a material for a piping system. Which of the following types of tubing should be used?

1. Steel alloy
2. Copper alloy
3. Aluminum alloy
4. Brass alloy

5-38. Flexible hose is identified by the manufacturer’s part number and the size or dash number. Which of the following is the best description of the dash number?

1. The outside diameter in eighth-inch increments
2. The inside diameter in sixteenth-inch increments
3. The outside circumference in eighth-inch increments
4. The inside circumference in sixteenth-inch increments

5-39. Gaskets in flange joints of a pipe are used for what purpose?

1. To allow for misalignment
2. To allow for expansion
3. To serve as a spacer
4. To prevent leakage

5-40. Packing material used for sealing is placed in or on which of the following areas?

1. In the stuffing box
2. On the outside of the stuffing box
3. In the revolving shaft
4. On top of the valve stem

5-41. Upon completion of visual inspection of a flexible hose assembly, a hydrostatic test is done to ensure what allowable maximum pressure?

1. Rated pressure for 1 hour
2. Twice the rated pressure for 1 hour
3. Rated pressure for not less than 1 minute
4. Twice the rated pressure for not less than 1 minute

5-42. Hose assemblies intended for gas or air service must be tested with

1. compressed air at 1 psi
2. hydrogen at 10 psi
3. nitrogen at 100 psi
4. oxygen at 1,000 psi

5-43. Fittings are used to connect pipe, tube, or hose to system components. One type of fitting is the bolted flange joint, which is used in systems operating at which of the following pressures?

1. 100 psi
2. 1,000 psi
3. 10,000 psi
4. All pressures now in use

5-44. The use of flange safety shields reduces the possibility of which of the following problems?

1. Fuel oil leaks
2. MER flooding
3. AMR fuel fires
4. Lube oil pooling

5-45. Many shipboard machinery casualties have resulted from fasteners that were not properly installed. Which of the following reasons can cause fasteners to loosen?

1. Machinery vibration
2. Thermal expansion
3. Thermal contraction
4. Each of the above

5-46. When installed and tightened, male threaded fasteners protrude at least one thread length beyond the top of the nut or plastic locking ring. The number of threads should not exceed five and in no case should thread protrusion exceed ten threads. This is the 1 to 10 rule.

1. True
2. False

5-47. Which of the following phrases best describe the refrigeration effect?

A. Heat will flow from a colder to a warmer object or environment
B. Heat will flow from a warmer to a colder object or environment
C. An artificial way of lowering the temperature
D. A mechanical transformation of the surrounding atmosphere

1. A and D
2. B and C
3. A and D
4. C and D

5-48. What is the unit of measurement for the amount of heat removed in a refrigeration system?

1. Btu
2. SAE
3. Latent heat
4. Refrigeration ton

5-49. Which of the following is/are the main part(s) of the R-12 system?

1. TXV
2. Capacity control system
3. Receiver
4. All of the above

5-50. What device maintains a constant refrigerant condensing pressure?

1. Evaporator
2. Capacity control system
3. Water regulating valve
4. Compressor

5-51. At what temperature will R-12 boil at atmospheric pressure?

1. 12°F
2. 0°F
3. -12°F
4. -21°F

5-52. Which of the following fans is generally preferred for exhaust systems that handle explosive or hot gases?

1. Centrifugal
2. Vane-axial
3. Tube axial

5-53. The vapor compression chilled water circulating system differs from a refrigerant circulating air-conditioning system in what way?

1. Method of evaporation
2. Method of compression
3. Method of condensing

5-54. Air compressors may be classified according to

1. make, model, and oil-free discharge
2. pressure, oil-free discharge, and type of compressing element
3. pressure, model, and oil-free discharge
4. type of compressing element, make, and model

5-55. Which of the following prime movers is directly connected to the vertical, five-stage, reciprocating high-pressure air compressor?

1. Steam turbine
2. Diesel engine
3. Electric motor
4. Pneumatic turbine

5-56. Medium-pressure air compressors have a discharge pressure range between

1. 51 and 100 psi
2. 101 and 150 psi
3. 151 and 1000 psi
4. 1001 and 1200 psi

5-57. Dehydrators are used for which of the following purposes?

1. To compress air
2. To cool compressed air
3. To add moisture to compressed air
4. To remove moisture from compressed air

5-58. Condensed vapor that is produced by a distilling plant is pumped to which of the following locations?

1. The firemain system
2. The condensate system
3. The ship’s freshwater tank
4. The overboard discharge tank

5-59. What is the purpose of the three wings on the tubular-type oil purifier?

1. They keep the oil rotating at the speed of the bowl
2. They collect the sediment or other impurities
3. They separate the oil into three layers
4. They help accelerate the rotation of the bowl

5-60. The direction of fluid flow in the electrohydraulic steering gears depends on which of the following factors?

1. Hydraulic ram
2. Tilt box angle
3. Power unit
4. Axial piston

5-61. What component is used for heaving in heavy mooring lines?

1. Winches
2. Windlasses
3. Wild cats
4. Whelps

5-62. The gypsy head on an electro-hydraulic winch is connected to the shaft by what means?

1. By adjusting the stroke of its hydraulic pump
2. By using a clutch
3. By adjusting the clearance between the friction surfaces of its brake
4. By regulating the operating voltage of its ac motor

5-63. If the hoisting cables should break on one side of an electro-hydraulic elevator, which of the following devices will prevent the elevator from falling?

1. The guide rails
2. The special control valves
3. The mechanical locks
4. The serrated safety shoes

5-64. To prevent excessive pressure in the oil feed lines of a lube oil pump system, which of the following types of valves should be used?

1. Governor
2. Relief
3. Throttle
4. Reducing

5-65. To get the desired temperature of oil leaving a tube-in-shell type of oil cooler, which of the following cooling actions is regulated?

1. The oil flow
2. The airflow
3. The seawater flow
4. The freshwater flow

5-66. Under ideal conditions, what kind of friction, if any, occurs when a main shaft rotates in a properly lubricated main journal bearing?

1. Fluid
2. Sliding
3. Rolling
4. None

5-67. Mineral lubricating oils can withstand the effects of high temperature and high speeds better than either animal or vegetable oils.

1. True
2. False

5-68. Main propulsion turbines and reduction gears use which of the following types of oil lubrication?

1. 9110
2. 3290
3. 3190 TEP
4. 2190 TEP

ASSIGNMENT 6

Textbook Assignment: "Instruments," Shipboard Electrical Equipment," and "Environmental Controls," chapters 11, 12, and 13, pages 11-1 through 13-7.

6-1. In a shipboard engineering plant, the instruments let operating personnel perform which of the following tasks?

1. Determine if machinery is operating within a prescribed range
2. Determine the operating efficiency of the plant
3. Provide data for reports and records
4. Each of the above

6-2. On a pressure gauge, the red hand (if installed) should be set at what point?

1. Zero
2. Slightly above the maximum normal operating pressure only
3. Slightly below the minimum normal operating pressure only
4. Slightly above or slightly below the maximum or minimum normal operating pressure

6-3. A Bourdon-tube gauge operates on what principal?

1. Volume changes in a straight tube tend to expand the tube
2. Volume changes in a coiled tube tend to collapse the tube
3. Pressure in a straight tube tends to bend the tube
4. Pressure in a curved tube tends to straighten the tube

6-4. If a curved Bourdon tube is used to measure pressure that exceeds 200 psi, it is made from what metal?

1. Copper
2. Bronze
3. Steel
4. Lead

6-5. In a simplex gauge, the free end of the Bourdon tube is attached to the indicating mechanism by a

1. linkage assembly
2. wire
3. cam
4. bellows assembly

6-6. You would use a simplex Bourdon-tube gauge if you were taking which of the following measurements?

1. The water depth in a freshwater tank
2. The amount of fuel oil flowing through a valve
3. The pressure in a compressed air system
4. The pressure drop between the inlet and the outlet side of a lube oil strainer

6-7. Vacuum gauges, which are used to indicate pressures below atmospheric pressure, have which of the following units of measurement?

1. Inches of water
2. Inches of mercury
3. Pressure per inch
4. Pressure per square inch

6-8. What Bourdon-tube gauge should you use to take pressure and vacuum measurements?

1. Duplex
2. Simplex
3. Compound
4. Differential

6-9. What type of gauge should be installed to check the pressure between the inlet and outlet sides of lube oil strainers?

1. Duplex
2. Simplex
3. Compound
4. Diaphragm

6-10. A bellows gauge can be used to take which of the following measurements?

1. Pressure up to 800 psig
2. Low pressures
3. Small pressure differentials
4. Each of the above

6-11. To measure pressure in the space between the inner and outer boiler casings, which of the following types of gauges is generally used?

1. A compound Bourdon-tube gauge
2. A duplex Bourdon-type gauge
3. A diaphragm gauge
4. A bellows gauge

6-12. A U-tube that is open to the atmosphere at one end and connected to a pressure source at the other end is known as a

1. bellows
2. manometer
3. diaphragm
4. Bourdon tube

6-13. The liquid in the capillary bore of a liquid-in-glass thermometer responds to a change in temperature by expanding or contracting, which causes what type of change, if any, in the thermometer graduations?

1. Relatively large
2. Relatively small
3. Inversely proportional
4. None

6-14. The element of a bimetallic expansion thermometer responds to a rise in temperature in what way?

1. By rising
2. By contracting
3. By changing colors
4. By changing the curvature

6-15. Which of the following is NOT a component of a distant-reading thermometer?

1. Bulb
2. Capillary tube
3. Thermocouple
4. Bourdon tube

6-16. Aboard ship, the exhaust temperature of diesel engines and heat-treatment furnaces is measured using what instrument?

1. A distant-reading thermometer
2. A bimetallic thermometer
3. A resistance thermometer
4. A pyrometer

6-17. The metals that make up the actuating element of a pyrometer respond to a rise in temperature by producing a/an

1. chemical reaction
2. electrical current
3. mechanical change

6-18. In the newer propulsion plants, temperatures are remotely monitored. Thermocouple temperature detectors are used with what other components to provide indications and alarms to the various engineering consoles?

1. Signal conditioners
2. Signal multipliers
3. Signal processors
4. Signal reversers

6-19. A resistive temperature detector (RTD) with a nickel element Is used to measure temperatures in which of the following ranges?

1. 400° to 600°F
2. 600° to 800 °F
3. 800° to 1,000°F
4. 1,000° to 1,200°F

6-20. The RTD elements designed for 600°F or greater service are made of what metal?

1. Copper
2. Nickel
3. Platinum
4. Silver

6-21. As temperature increases around an RTD, what will happen to the corresponding resistance of the RTD?

1. It remains the same
2. It increases by a proportional value
3. It decreases by a proportional value
4. It fluctuates erratically

6-22. You are troubleshooting an RTD circuit. What is indicated by a very low or zero meter reading?

1. A short circuit
2. An open circuit
3. An abnormal reading; but not an immediate problem condition
4. A normal reading; circuit malfunction is not indicated

6-23. If the RTD of a 0° to 300°F meter were to open, you would expect to receive which of the following indications?

1. 100°F
2. 200°F
3. 300 °F
4. 0°F

6-24. At the shipboard level, what corrective maintenance should you perform on a defective RTD?

1. Remove the RTD and repair it in the shop
2. Remove the RTD and replace it with a new one
3. Repair the RTD in place

6-25. Meters on control consoles display units of pressure or temperature; but, they are actually what type of meter?

1. Ohmmeter
2. Ammeter
3. Dc voltmeter
4. Wattmeter

6-26. Voltmeters installed in switchboards (SWBD) and control consoles all have what type of resistive value?

1. Adjustable
2. Variable
3. Fixed
4. Indefinite

6-27. To allow an ammeter to handle high SWBD current, what component is installed with it?

1. A current transformer
2. A potential transformer
3. A step-down transformer
4. A step-up transformer

6-28. A failing generator is being operated in parallel with a good generator. Normally, the loss of which of the following outputs indicates this condition?

1. Voltage
2. Amperage
3. Frequency
4. Kilowatt load

6-29. You are observing a synchroscope, and the output frequency of the oncoming generator and the on-line generator is the same. What indication will you receive from the moving element (pointer)?

1. It holds a fixed position
2. It rotates slow in the fast direction
3. It rotates fast in the slow direction
4. It oscillates erratically between the fast and slow directions

6-30. What condition is indicated when the three neon lamps located on the face of the phase-sequence indicators are lit?

1. Three cables are connected to the bus
2. The phase-sequence is correct
3. All three phases are energized
4. One of the three fuses has blown

6-31. Which of the following sensors is used to determine the specific level in a fuel tank at any given time ?

1. Tank level indicator (TLI)
2. Liquid level indicator (LLI)
3. Float level
4. Contact level

6-32. A typical TLI transmitter section contains what type of voltage network?

1. Multiplier resistor
2. Multiplier inductor
3. Divider resistor
4. Divider inductor

6-33. In a seawater-compensated fuel tank, the float of the TLI is designed to stay at what location?

1. At the top of the fuel
2. At the seawater/fuel interface
3. At the bottom of the seawater
4. Between the seawater/full interface and the top of the tank

6-34. To measure the rotational speed of a shaft, what instrument is commonly used?

1. A hydrometer
2. A tachometer
3. A manometer
4. A barometer

6-35. The propeller indicator mounted on the propulsion shaft can give which of the following information about the shaft rotation?

1. The direction of rotation
2. The number of revolutions
3. The speed of rotation
4. All of the above

6-36. What tachometer has a flashing light that determines the speed of a rotating shaft?

1. Hand-held mechanical
2. Resonant reed
3. Stroboscope
4. Chronometric

6-37. What instrument is used to indicate the salt content of the ship’s distilled water?

1. A liquid level indicator
2. A salinity indicator
3. A pressure indicator
4. A chemical indicator

6-38. To apply a specific, predetermined amount of torsion to a bolt on the main engine, you should use what type of wrench?

1. Torque
2. Rachet
3. Crescent
4. Combustion

6-39. While using a micrometer-setting torque wrench, the user knows the desired torque has been reached when

1. a predetermined setting iniates an audible click
2. the needle reaches the desired torque on the dial indicator
3. the deflecting beam reaches the desired torque
4. the pointer reaches the torque indicator

6-40. Before using a torque wrench, you should check which of the following labels?

1. Safety
2. Adjustment
3. Collimation
4. Calibration

6-41. Which of the following substances offers resistance to electric current?

1. Iron
2. Copper
3. Aluminum
4. Mica

6-42. What term defines the rate at which current passes through a circuit?

1. Ampere
2. volt
3. ohm
4. Watt

6-43. A unit of electrical resistance is known as a/an

1. watt
2. ampere
3. ohm
4. volt

6-44. A soldering iron is rated at 100 watts. This statement provides which of the following information about the soldering iron?

1. The power consumed by the soldering iron
2. The emf of the iron
3. The resistance of the iron
4. The rate at which current flows through the soldering iron

6-45. A shipboard generator operates at maximum efficiency under which of the following conditions?

1. At full-rated load
2. With all batteries fully charged
3. At periods of minimum power demand
4. When in series with other generators of the same rated output

6-46. The rotating member of a dc generator is known as the

1. field winding
2. armature
3. rotor
4. yoke

6-47. Most emergency generators installed on ships operate at what voltage and frequency, respectively?

1. 450 volts, 60 hertz
2. 220 volts, 50 hertz
3. 450 volts, 50 hertz
4. 110 volts, 60 hertz

6-48. Revolving-field generators are superior to revolving-armature generators for which of the following reasons?

1. The load current from the stator is connected to the external circuit without the use of a commutator
2. Only two slip rings are required to supply excitation
3. The stator windings are not subjected to mechanical stresses
4. All of the above

6-49. A high-speed, turbine-driven alternator is prevented from overheating by which of the following safety provisions?

1. An alternator used with other alternators that automatically goes off when it becomes warm
2. A forced air ventilation system that circulates air through the stator and rotor
3. A heat-limiting governor that controls the temperature
4. A metal structure surrounded by cold water that encases the alternator parts

6-50. Turbines that drive the ships service generators receive their energy from what source?

1. Batteries
2. Diesel engines
3. Saturated steam
4. Superheated steam

6-51. Ships generators supply electricity at a constant voltage and frequency. For this to happen, what condition must be met?

1. A high-frequency output
2. A low-frequency output
3. The turbines must operate at a variable speed to meet demands of variable loads
4. The turbines must operate at a constant speed under variable loads

6-52. Emergency generators are driven by diesel power rather than steam turbine power because diesel engines have what advantage?

1. They generate more power than turbines
2. They start faster than turbines
3. They are easier to operate than turbines
4. They are less of a fire hazard than turbines

6-53. Special, closely regulated electrical power used for specific loads is furnished by which of the following power suppliers?

1. Turbine generator
2. Diesel generator
3. Motor generator
4. Ship’s service switchboard

6-54. Ship’s service-generating units and their associated distribution switchboards are interconnected to other distribution switchboards by what circuit?

1. Short
2. Bypass
3. Bus tie
4. Alternator

6-55. During load changes, the automatic voltage regulator maintains a constant voltage by varying the

1. armature resistance
2. field excitation
3. generator speed
4. governor speed

6-56. What device is used to isolate a faulty circuit?

1. A resistor
2. A rectifier
3. A circuit breaker
4. A voltage regulator

6-57. What device maintains the generator voltage to within specified limits?

1. A voltmeter
2. A voltage regulator
3. A circuit generator
4. A resistor regulator

6-58. An ac motor has which of the following advantages over a dc motor?

1. It is larger
2. It is smaller
3. It requires less power
4. It rotates at a faster speed

6-59. Shipboard motor controllers are used for which of the following purposes?

1. To start and to stop motors
2. To increase or decrease motor speed
3. To reverse the direction of a rotating shaft
4. Each of the above

6-60. Which of the following pieces of equipment may be equipped with electric brakes?

1. Anchor windlasses
2. Auxiliary pumps
3. Switchboards
4. Generators

6-61. When supply voltage has been restored, what type of motor controller will (a) automatically restart the motor and (b) require manual startup?

1. (a) High-voltage release
   (b) low-voltage protection
2. (a) High-voltage release
   (b) high-voltage protection
3. (a) Low-voltage release
   (b) low-voltage protection
4. (a) Low-voltage release
   (b) high-voltage protection

6-62. You should protect batteries from salt water for which of the following reasons?

1. To prevent release of poisonous gases
2. To prevent the battery from being ruined
3. Both 1 and 2 above

6-63. In which of the following ways are the power and lighting distribution systems different?

1. The systems have different power sources
2. The power distribution system carries higher voltage
3. The power distribution system’s cables are more numerous
4. The lighting distribution systems have larger cables

6-64. As required by shipboard electric safety programs, all personally owned electrical equipment must be checked before being used aboard ship.

1. True
2. False

6-65. Before repairs can be made to an electric motor, which of the following precautions must be met?

1. The controller must be tagged out
2. The circuit must be disconnected
3. Both 1 and 2 above
4. The pump end of the motor must be disconnected

6-66. Heat stress is the body’s inability to cope with a high-temperature and high-humidity environment. The term “heat stress” is a general term used to describe which of the following physical problems?

1. Heat cramps
2. Heatstroke
3. Heat exhaustion
4. All of the above

6-67. What type of heat stress is life threating?

1. Heat exhaustion
2. Heat cramps
3. Heatstroke

6-68. When administering first aid to a heatstroke victim, what step should you take first?

1. Lower the victim’s body temperature
2. Administer a salty, cool liquid
3. Cover the victim with a blanket and elevate the head
4. Cover the victim with a blanket and elevate the feet

6-69. You should NOT take which of the following actions when working in conditions that could cause heat stress?

1. Drink commercially prepared electrolyte supplements
2. Wear starched clothes
3. Take salt tablets
4. Each of the above

6-70. The ships Oil Spill Containment and Cleanup Kit (O.S.C.C.K.) consists of which of the following materials?

1. Porous mats, grappling hooks, boat hooks, metal containers, and a fire retardant
2. Porous mats, a chemical fire retardant, grappling hooks, plastic bags, and an instruction book
3. Porous mats, grappling hooks, boat hooks, plastic bags, and an instruction book
4. A chemical fire retardant, grappling hooks, plastic bags, porous mats, and an instruction book

6-71. Continued exposure to impulse or impact noise greater than 140 decibels can cause which of the following hearing losses?

1. Normal
2. Severe
3. Slight
4. Intermittent

6-72. Personnel who work with asbestos and smoke should be aware that their chances of contracting lung cancer are increased by which of the following rates?

1. Tenfold
2. Twentyfold
3. Fiftyfold
4. Ninetyfold

6-73. When work is being done on refrigeration systems, the area should be monitored with which of the following devices?

1. A low-pressure gauge
2. A flame safety lamp
3. A halide monitor
4. A TLV detector

6-74. To alleviate the detrimental effects of shipboard sewage on the environment, which of the following devices are installed on Navy ships?

1. High-concentration sewage devices
2. Chemical sanitation devices
3. Marine sanitation devices
4. Pier-side devices

6-75. Zero liquid discharge is a design feature of which of the following MSD systems?

1. LHA
2. Jered
3. LPA
4. Jiffy

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